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ABSTRACT

This study continued to replicate and extend research dealing with children's perceptions of vulnerability to health problems. Responses of 774 children, 8 to 17 years old, to 15 questions about the likelihood of encountering various health problems confirmed previous results indicating that perceived vulnerability is consistent across health problems. Perceptions of vulnerability were predictably less consistent in younger children than in older ones. Moreover, a consistent pattern of expectancies was found that was not affected by age, sex, or socioeconomic factors measured in terms of area of residence. These results have relevance for public health professionals concerned with the content and timing of educational programs. Evidence continues to suggest that health educators interested in heightening children's perceptions of vulnerability, as a first step in shaping or inducing adaptive health behaviors, might find it appropriate to deal with a child's entire set of such perceptions rather than with the expectancies of one particular problem. There is some evidence that suggests that dental health education programs be included in a comprehensive health education program. (Author/DB)

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Consistency in children's perceptions of vulnerability to health problems.

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Age, sex, and socio-economic factors are usually considered to be powerful determinants of most behaviors that concern health professionals and social scientists. But the research process is often so committed to unearthing differences accounted for by these factors, that important underlying similarities are overlooked. Yet these similarities may have importance in planning successful health education programs and in increasing the utilization and effectiveness of health services.

Earlier research conducted by the senior author (1, 2) revealed that children and young adults exhibit consistency in their expectancies of health problems in two ways: 1) the degree to which a child expects some one specific illness, accident, or other health problem is related to the degree to which he expects other such problems and 2) the degree to which some specific health problem is expected by one age-sex group is markedly related to the degree to which it is expected by other age-sex groups. Studies conducted in 1967 and 1968 established, replicated, and extended these observations, but did not explore the effects of socio-economic differences on the consistency of these patterns. Moreover, the collaborating

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authors suggested the possibility of determining whether such consistency also extended to the area of dental problems. Accordingly, one major goal of this study was the examination of the effects of socio-economic status as well as those of sex and age, on a variety of health and dental problems.

In addition, several psychological theories of child development suggest that younger children exhibit less interdependence in their belief systems than do older ones, i.e., a lesser degree of relationship among component beliefs. A major goal of this study was a closer examination of the derivative hypothesis that younger children manifest less consistency in their expectancies of health problems than do older ones.

SUBJECTS AND METHOD

A sample of 774 children was obtained through the school system of a large Great Lakes area city. At grade levels 3 through 6, one class was obtained in each of four schools, two located in innercity and two in non-innercity areas. For grades 7 through 9, two classes at each level were obtained in an innercity junior high school and two were obtained in non-innercity junior high school. Of these children, 429 were white and 321 were non-white (data were not available for 24); 402 lived in non-innercity areas and 372 lived in the innercity. Virtually half (397, 51.3%) were male and half (377, 48.7%)

were female. A total of 28 classes, four at each of seven grade levels was thus obtained.

Health and dental problem expectancies were assessed through the responses to a series of 15 questions, such as "What chance is there of your getting the flu during this next year?" The expectancies dealt with a bad accident, a rash, fever, having a tooth pulled, a sore throat, flu, a toothache, a cold, bleeding gums, an upset stomach, missing a week of school because of sickness, a cavity, a bad headache, breaking or cracking a tooth,and cutting a finger accidentally. These health problem expectancy questions were interspersed with 8 others relating to other aspects of the children's lives; for example, "What chance is there of your playing with your friends during this next year?"

For each item, a youngster was instructed to select one response from among 7 alternatives that best expressed his expectancy: no chance, almost no chance, a small chance, a medium chance, a good chance, almost certain, or certain. The items and the response alternatives were selected so that they were appropriate for the entire age range of the sample, and the instructions were designed so that even the youngest subject understood the task and the continuum of responses. Pilot work had revealed that the question format and response alternatives used earlier in the 1967 and 1968 studies (1, 2) had

to be revised before they could be suitable for the sample used in the present study. Our research staff was satisfied that with the present format even the youngest children understood the instructions well enough to answer the questions appropriately.

The responses were scored from 1 for the "no chance" alternative to a maximum of 7 for a response of "certain."

The questionnaire was administered during regularly scheduled class time. The potential subjects were assured of confidentiality and anonymity, and were permitted to decline to participate if they wished. In all classes, to insure standardization, we read each item aloud. The sessions generally lasted from about 35 minutes for the higher grades to nearly 55 minutes in the lower grades.

RESULTS

Consistency in health problem expectancies.

Pearson product-moment correlation analyses (3, ch. 8) were performed to determine the relationships between a child's expectancy of one health problem and his expectancies of others. In 101 of the total of 105 possible pairs of expectancy items the correlations were statistically significant; 96 of these, beyond the .0005 level of confidence. Furthermore, when dental problems and non-dental problems were viewed separately, responses to all of the ten possible pairs of dental items and

all of the 45 possible pairs of non-dental items, showed correlations significant beyond the .0005 level.

When the sample was subdivided into innercity and non-innercity groups, the significance of these correlations remained virtually the same: among innercity children, 101 pairs of expectancies were significant; among non-innercity children, 99 pairs were significant. In addition, among boys, 98 correlations remained significant; among girls, 96. Among children under 12, 99 remained significant; among those 12 and over, 95.

Although in prior studies (1, 2) the senior author used 10 years of age as a cutting point, the present sample was somewhat older and age 12 was used to split the sample into younger and older subgroups. There were 357 children under 12 years of age, and 393 who were 12 or older (age data were missing for 24).

Correlation matrices are interpretable primarily in terms of overall consistency in a sample, but they do not readily allow comparisons of the level of consistency between different groups, and the slightly higher number of significant correlations that appear in children under 12 says nothing about the relative magnitudes and distributions of the sample correlations. To test the hypothesis that the degree of consistency in younger children is in fact lower than that in older children, a more

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precise measure of individual consistency is required. An appropriate measure is obtained by using an average deviation score: a composite health problem expectancy score is obtained by computing the mean of the child's 15 individual expectancy scores, deriving the absolute values of the differences between each specific score and this composite, averaging these absolute differences and using this average as a measure of consistency. Where a child's several responses were close to his composite score, this average of absolute differences would be low; where the several responses varied widely around the composite score, the average absolute difference would be high. Thus a relatively high deviation score reflects relatively low consistency and a relatively low absolute deviation score reflects relatively high consistency. Composite expectancy scores and consistency scores were also computed separately for dental and non-dental problems.

The mean consistency score for children under 12 was 1.37; that for children 12 or older was 1.24. A t-test analysis (3, ch. 7; 4, ch. 10) revealed this difference to be significant ($t=3.42$, $p < .0005$). Similar analyses were performed separately for innercity and non-innercity children. Among innercity children the consistency score for those under 12 was 1.41, for those 12 or older, 1.26; among non-innercity children the mean consistency score for those under 12 was 1.34, for those 12 and older 1.22. In each instance there was a significant difference between the two

(t=2.45 and 2.43, respectively; ps $<$ .01). Relatively less consistency exists within the younger child's expectancies than within the expectancies of older children. No significant differences in overall consistency scores were observed between innercity and non-innercity children.

Consistency in patterns of expectancy.

The mean expectancy levels within the entire sample for each health problem are presented in Table 1. The children perceived breaking or cracking a tooth as least likely among all the health relevant events and having an upset stomach as most likely. The consistency of this pattern of expectancies was determined by rank correlation analyses.

Table 2 shows the mean scores for each expectancy for youngsters under 12 years of age and for those 12 and older, as well as the ranks assigned to each mean. The rank-order correlation coefficient (5, ch. 9) for these two sets of rankings was .97, a figure indicating nearly perfect agreement between the rankings of the two age groups ($p < .01$). Table 3 presents the mean expectancy scores for each question by sex; the correlation computed for these two sets of rankings was .95, again indicating extremely high agreement ($p < .01$). Table 4 presents the mean expectancy scores by area of residence; the correlation computed between these two sets of rankings was .84, indicating marked agreement ($p < .01$). To determine whether the same pattern existed when age, sex, and area of residence were considered conjointly, the sample was divided further into 16 groups according to sex, area of residence,and four levels

of age (under 10 years, 10-11, 12-13, 14 and older). Table 5 presents these rankings. The coefficient of agreement (5, ch. 9) was .79 indicating marked agreement among 16 different sets of rankings ($p < .001$).

Interesting differences emerge, however, when dental and non-dental expectancies are considered separately. Virtually no differences exist in the patterns of expectancies for boys and girls, children under 12, and those 12 or older on either the dental or non-dental items, but the rankings of the dental expectancies of innercity and non-innercity children do not agree, although marked agreement can be observed in the rankings of the non-dental expectancies. Table 6 presents the mean expectancy score for each of the five dental items for innercity and non-innercity children, and the ranks assigned to these scores. Although there is agreement between the two groups on their relative expectancies of breaking or cracking a tooth, and near agreement on the relative expectancies of a cavity, there are disagreements - in 2 minor instances - on other expectancies. It is anticipated that the absolute differences between the mean expectancy levels for each problem will be discussed in a future paper.

Furthermore, when composite consistency scores for dental problems and non-dental problems are considered separately, significant differences are still observed between children under 12 and those 12 or older among non-dental expectancies for the entire

sample ($t=4.48$, $p < .0005$), as well as for innercity ($t=3.10$, $p < .0005$), and for non-innercity ($t=3.32$, $p < .0005$) children. For dental items, these differences virtually disappear.

Age, sex, and socio-economic differences in level of expectancy.

A multiple analysis of variance (F test, 3, ch. 16) on composite expectancy scores revealed that sex, age (using 4 different levels), and area of residence are important determinants of expectancy of health problems. Girls have significantly higher expectancies than boys ($F=8.83$, $p < .01$), older children higher expectancies than younger ones ($F=11.08$, $p < .001$), and children from the non-innercity higher expectancies than those in the innercity ($F=28.30$, $p < .001$). Moreover, there were significant interaction effects between age and area of residence ($F=5.85$, $p < .001$) indicating that the effect of these two variables is not merely additive but that they operate jointly to enhance prediction.

For dental problem expectancies alone, only age seems to be a direct determinant of level of expectancy ($F=5.53$, $p < .001$), and age and sex together interact significantly as determinants ($F=5.14$, $p < .01$). For non-dental problems, sex, age, and area of residence again were significant determinants ($F=10.26$, $p < .001$; $F=12.07$, $p < .001$; $F=56.13$, $p < .001$), and age and area of residence interacted significantly ($F=6.08$, $p < .001$) as predictors.

In addition, overall expectancies of dental and non-dental problems were significantly related for the entire sample ($r=.44$, $p < .0005$), for innercity ($r=.49$, $p < .0005$), non-innercity ($r=.43$, $p < .0005$), male ($r=.47$, $p < .0005$), female ($r=.41$, $p < .0005$), younger ($r=.50$, $p < .0005$), and older ($r=.37$, $p < .0005$) children. Consistency levels within dental and non-dental expectancies were also significantly related for the entire sample ($r=.43$, $p < .0005$), for innercity ($r=.44$, $p < .0005$), non-innercity ($r=.42$, $p < .0005$), male ($r=.42$, $p < .0005$), female ($r=.46$, $p < .0005$), younger ($r=.43$, $p < .0005$) and older ($r=.41$, $p < .0005$) children.

DISCUSSION

Stability of expectancy patterns.

By far the most interesting finding of the study is the independence of the overall pattern of health problem expectancies from socio-economic status, as defined by area of residence. Possibly, however, socio-economic status has some specific, selective effect on the pattern of dental problem expectancies. One possible explanation can be found in the differential degree to which dental services are available and accessible to the two types of communities. In the innercity, it can be reasonably assumed that dental services are far less available and accessible than in non-innercity areas. There is thus a greater likelihood that children in non-innercity areas will make preventive dental visits and will have a higher likelihood of cavities being discovered and a lower likelihood of cavities developing to the point where a toothache is experienced. This could account for some of the discrepancies

between the ranking of expectancies for "cavities" and "toothaches" in the two groups. However, it is not a satisfactory explanation. Prior research suggested that a simple relationship between experience and expectancy does not exist (6). Moreover, although there is some evidence in the present study that experiences of dental trauma are positively related to overall dental problem expectancy scores, and that innercity children report significantly greater numbers of such traumata, the levels of dental problem expectancies of the two groups are virtually identical: innercity, 3.66, non-innercity, 3.61.

A more satisfactory explanation emerges when one considers the reduction of the number of problems to be ranked, which increases the disturbing effect of minor rank differences: even small discrepancies in rank orderings can destroy statistical significance with such a small number of items. Thus, the apparent attenuation of the correlation coefficients can readily be interpreted as a statistical artifact. As evidence of this, when the pattern of dental problem expectancies of different age, sex, and socio-economic groups is examined, a significant relationship again emerges among the 16 different sets of ranks (coefficient=.57, $p < .01$, Table 7). Apparently, increasing the number of rankings decreased the likelihood of minor rank differences destroying significance. And, in a similar vein, the 16 different groups show marked agreement in

their rankings of the non-dental health problem expectancies (coefficient=.80, $p < .001$).

The levels of both expectancy and consistency within dental and non-dental problems provide additional interesting contrasts, as well as a way of understanding the lack of developmental increase in consistency among dental problem expectancies. (These findings are based on comparing each child's scores on some pair of variables and analyzing the difference between them by way of a t-test.) Children show significantly lower expectancies of dental than of non-dental problems; the mean dental problem expectancy for the entire sample is 3.63; for non-dental problems it is 4.33 ($t=16.44$, $p < .000001$). They also show significantly higher levels of consistency among their expectancies of dental problems. The mean dental problem consistency score was 1.12. For non-dental problems it was 1.20 (note that a higher value represents lower consistency; $t=3.67$, $p < .0003$). Similar significant differences are also found when separate analyses are performed for inner and non-innercity children, and for children under 12. Among children 12 or older, only the difference in levels of expectancy is significant. In this group, the consistency levels of dental and non-dental problems is virtually identical: 1.09 and 1.11, respectively.

In the younger children observed in this study, consistency in dental problem expectancies is already appreciably higher than

consistency in non-dental expectancies. Thus the increased interdependence within belief systems that theoretically occurs in older children will have a greater chance to affect consistency in non-dental problem expectancies and thus elevate them to the same level already attained at some earlier age among dental problems.

At some age beyond the lower limit of the sample observed here, children apparently acquire a perceptual pattern of health problem expectancies that remains stable over time. In not one of these studies is there evidence that either sex-role differentiation in later childhood and adolescence or chronological development appreciably affect this pattern. The present study indicates, as well, that socio-economic status, defined in terms of innercity non-innercity residence, has no appreciably consistent effect on the pattern.

Rokeach (8, pp. 40-42) has suggested that central beliefs, such as those about authority, the physical world, and the self, emerge very early in life, remain unquestioned ,and appear self-evident to the person holding them. If beliefs about health problems represent some intersection of beliefs about the physical world and beliefs about the self, then it stands to reason that these thus emerge early, remain unexamined,and impermeable to experience.

Perceived vulnerability: a personality characteristic.

A second important finding is the continued replication of previous observations that in boys as well as girls, in younger as well as older children, in children coming from innercity as well as non-innercity areas, the degree to which a child expects some one health problem is related to the degree to which he expects other such problems. Such replication attests to the appropriateness of using overall expectancy scores for health problems in general, as well as for dental and non-dental problems. It also strengthens the assertion that perceived vulnerability to health problems is a general personality characteristic, readily measured by overall expectancy scores and should become a focal point for systematic research. It becomes reasonable at this point, moreover, to use the phrase "perceived vulnerability" rather than overall or composite expectancies.

The significant correlations between levels of perceived vulnerability to dental and non-dental problem expectancies indicate that the child who perceives himself as relatively likely to encounter non-dental problems also sees himself as being relatively likely to encounter dental problems, although the actual degree of perceived vulnerability to dental problems may be lower. A child who perceives himself as relatively invulnerable to non-dental problems also sees himself as being similarly invulnerable to dental problems. Together with the

significant correlations between levels of consistency within dental and non-dental expectancies, these observations suggest that there is considerable similarity in the organization or patterning of the two types of beliefs, and that whatever psychological factors are responsible for the level of perceived vulnerability to one type of health problem might be similarly responsible for the other.

What are the antecedents of perceived vulnerability? Is it simply rooted in personal history of health problems, or is it some form of, or otherwise related to, anxiety and its concomitant free-floating fear? How does it relate to aspects of health behavior? At what age does it begin to assume the stable organization that it exhibits in the research reported here and elsewhere?

Analyses and research both in progress and projected should provide some answers to these questions. To the degree that perceived vulnerability to health problems becomes integrated with a body of research findings and behavioral theory, it will assure greater relevance and importance to public health professionals.

Since this is a report of the third study in a series of continuing investigations, it becomes exceedingly difficult to consider that this or any of the preceding studies yielded spurious, non-replicable results. The existence of organized

patterns of health problem expectancies in individual children and in different groups of children seems to be an established, repeatably demonstrable set of events. Clearly, health beliefs as they are herein considered, manifest the psychological property of interdependence as do other components of belief systems. Psychologists should overcome the inertia exhibited in dealing with general health in contrast to mental health or psychosomatics, and profitably begin to explore health related behavior as a meaningful regular human process.

Age and consistency.

A third important observation, that older children exhibit higher degrees of consistency than do younger ones, particularly among non-dental expectancies, also supports and corroborates previous research (2), but the exact nature of the functional relationship between age and consistency remains undetermined. A correlation ratio (3, ch. 15) of .17 computed between age and consistency scores indicated that some overall relationship exists between the two, but a correlation coefficient of -.06 between age and consistency scores indicated only a slight (albeit statistically significant, $p < .05$) inverse relationship. A test for curvilinearity (3, ch. 15) based on the difference between the value of these two coefficients, revealed a significant non-linear relationship. Apparently there is some decrease in error in the prediction of overall consistency if one knows

the child's age but there is no linear relationship between the two. Older children will show greater consistency than younger ones, but the relationship cannot be represented by a straight line, or by some readily interpretable mathematical expression.

Factors affecting perceived vulnerability.

In contrast to the similarities observed in patterns of health problem expectancies in different sex, age, and socio-economic groups, actual levels of perceived vulnerability scores do vary among these groups. The failure of earlier research (1, 2) to reveal these relationships can be attributed both to the relatively small sizes and to the greater homogeneity of the earlier samples.

It is not surprising that older children show higher levels of perceived vulnerability than do the younger ones even though the differences between the expectancy levels of the two groups is not spectacularly large, e.g., those 12 and over have an overall expectancy score of 4.25 compared to 3.94 for those under 12. While the infant and very young child may perceive himself as being omnipotent and invulnerable to threats and dangers, part of the normal developmental process involves the child's coming to terms with pain and stress and recognizing that these may be part of his experience. Additional analyses revealed that the relationship between age and perceived vulnerability is probably linear.

The sex differences in perceived vulnerability are also not surprising. It is apparent that socialization processes in contemporary American society operate differentially upon the sexes. Girls are less likely than boys to be rewarded for rough and tumble, independent behavior; they are more likely to be rewarded for "careful", polite dependency (e.g., 9, pp. 289-293). This reinforcement pattern is likely to lead them to be overly concerned and anxious about many aspects of their experience environment, particularly health and illness. Moreover, they are prone to admit more freely to these concerns and anxieties than are boys. Mussen, Conger and Kagen (9, pp. 104-105) report some evidence - although not conclusive - that neonate girls have somewhat lower pain thresholds than neonate boys. To the extent that such evidence is replicated it might serve as a basis for understanding the observed sex difference in health problem expectancies: girls are more sensitive than boys to potential pain and stress.

What is most interesting is the observation that children in the innercity have significantly lower expectancies of encountering health problems than children in non-innercity areas, 3.94 compared to 4.25 and significantly lower non-dental expectancies, 4.07 compared with 4.57. At first glance one would surmise that accessibility to and availability of health services would have some effect on the child's experience of illness and

health problems, that innercity children would have more frequent encounters with health problems in the past than would non-innercity children and that such encounters and experiences would lead to a greater degree of anticipation of similar problems in the future. While no information was obtained on past history of general health problems, innercity children do report a far greater number of traumatic reasons for their last visit to the dentist than do non-innercity children simultaneously with no differences in their expectancies of dental problems. These findings are consonant with inferences that can be made from evidence already available (e.g., 7, ch. 2) that the population sampled in the innercity would have lower expectancies than that sampled in non-innercity communities.

Implications.

Perceived vulnerability to health problems is relevant to public health professionals, particularly health educators and planners of health services, in a number of ways, primarily as an important determinant of taking specific health actions. The health-belief model (e.g., 10) suggests that the likelihood of a person taking some preventive or adaptive step is a function, among other things, of the degree to which he sees himself as being susceptible (vulnerable) to some health problem. Accordingly, attempts to elicit or shape some particular health behavior should depend, in part, on changing the level of perceived

vulnerability. Haefner and Kirscht (11) present evidence of this relationship at the same time indicating the difficulty encountered in attempting to alter perceived vulnerability in any large measure.

The observed consistency in health problem expectancies indicates that perceived vulnerability has a coherence and stability of its own. Consequently, attempts to modify individual components, i.e., expectancies of particular health problems, are likely to be unsuccessful. There is substantial psychological evidence that interdependent, or consistent, belief systems are remarkably resistant to this type of change (e.g., 8). On the other hand, attempts to alter the overall level of perceived vulnerability by focusing on a large number of its components in some rational way, might be more successful. Health educators might profitably channel their energies into programs and communications directed toward such a multi-problem attack.

Moreover, such multi-problem attacks on perceived vulnerability might have to begin at a very early age, perhaps even in kindergarten or in pre-school settings. If beliefs about vulnerability do, in fact, represent a group of central, "primitive" beliefs, it is highly unlikely that they will change as readily during later childhood or adult years.

The significantly lower levels of perceived vulnerability to dental problems compared to non-dental problems in the total sample, in innercity, non-innercity, younger and older children, together with the higher consistency within dental problem expectancies in all but older children, point to a problem of considerable relevance for dental health educators. Possibly, expectancies of dental problems are coherently organized around too low a level of perceived vulnerability either to permit a ready shift to a higher level of perceived vulnerability, or to facilitate adoption of some desirable dental health behavior. Since relative levels of perceived vulnerability as well as consistency with dental problems are related to their counterpart in non-dental problems and for the same reasons used above in suggesting a multi-problem attack (i.e., the psychological evidence that consistent belief systems are remarkably resistant to piecemeal change), it would be appropriate to embed dental health communications and education programs within an overall health education program as a more effective way of modifying levels of vulnerability and/or health behaviors.

Along with marked and increasing consistency in the organization of health problem expectancies, overall levels of perceived vulnerability also increase with age, indicating to health educators that older children, particularly those 12 and over, may be more amenable than younger ones to accepting

health communications designed to elicit some preventive or adaptive behavior. (Of course, older children may also have greater levels of control over their own behaviors than younger ones.) Since the relationship between age and consistency is not linear, longitudinal research in progress might hopefully reveal particular ages where some combination of level and consistency of perceived vulnerability offers greatest promise of acceptance of health messages.

In addition, the observation that even for those children 12 and older, the average perceived vulnerability score was 4.25, indicates only a slight tendency to perceive susceptibility. This suggests that American adults do not view themselves as generally vulnerable to health problems. Even more important, is the significantly lower level of vulnerability for the children in the innercity, which indicates that large segments of the population most in need of health services manifest psychological dispositions that serve as barriers to their utilization of such services. Whether such dispositions reflect psychological defenses that facilitate coping with the all-too-threatening real health problems faced by this social group, a set of norms acquired through socialization, or some combination of these, cannot be determined from available data. What does emerge to confront health professionals is the problem of how to increase this level to enhance utilization of health

services, particularly when these are made more readily available and accessible to all segments of the population.

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Table 1. Mean expectancy scores for total sample of 774 children

Expectancy	Mean	Rank
Break tooth	3.03	1
Accident	3.24	2
Pull teeth	3.42	3
Missing school because of sickness	3.52	4
Flu	3.63	5
Rash	3.66	6
Gums to bleed	3.72	7
Toothache	3.82	8
Cavity	4.18	9
Fever	4.51	10
Sore throat	4.71	11
Cold	4.91	12
Cut finger	4.98	13
Headache	4.99	14
Upset stomach	5.16	15

NOTE: The expectancy scores themselves range from 1 (lowest) to 7 (highest); the means are then ranked from 1 to 15.

Table 2. Mean expectancy scores and rankings for 750 children, by age group

Expectancy	Under 12 years (N = 357)		12 and older (N = 393)	
	Mean	Rank	Mean	Rank
Break Tooth	2.83	1	3.20	1
Accident	3.03	2	3.41	2
Pull teeth	3.32	3	3.53	3
Missing school because of sickness	3.43	5	3.60	4
Flu	3.36	4	3.89	7
Rash	3.60	6	3.67	5
Gums to Bleed	3.68	7.5	3.75	6
Toothache	3.68	7.5	3.92	8
Cavity	3.99	9	4.34	9
Fever	4.39	10	4.64	10
Sore throat	4.46	11	4.95	11
Cold	4.73	13	5.11	12
Cut finger	4.71	12	5.25	14
Headache	4.89	14	5.12	13
Upset stomach	5.00	15	5.31	15

NOTE: The expectancy scores themselves range from 1 (lowest) to 7 (highest); the means are then ranked from 1 to 15.

Table 3. Mean expectancy scores and rankings for 774 children, by sex

Expectancy	Boys (N = 397)		Girls (N = 377)	
	Mean	Rank	Mean	Rank
Break tooth	2.97	1	3.10	1
Accident	3.28	2	3.19	2
Pull teeth	3.34	3	3.51	3
Missing school because of sickness	3.45	5	3.60	4
Flu	3.37	4	3.89	7
Rash	3.56	6	3.76	6
Gums to bleed	3.73	8	3.71	5
Toothache	3.70	7	3.94	8
Cavity	4.10	9	4.26	9
Fever	4.33	10	4.71	10
Sore throat	4.56	11	4.88	11
Cold	4.67	12	5.16	14
Cut finger	4.99	14	4.98	12
Headache	4.88	13	5.11	13
Upset stomach	5.03	15	5.29	15

NOTE: The expectancy scores themselves range from 1 (lowest) to 7 (highest); the means are then ranked from 1 to 15.

Table 4. Mean expectancy scores and rankings for 774 children, by area of residence

Expectancy	Inner City		Noninner City	
	Mean	Rank	Mean	Rank
Break tooth	3.15	2	2.92	1
Accident	3.10	1	3.36	3
Pull teeth	3.80	7	3.07	2
Missing school because of sickness	3.47	5	3.58	4
Flu	3.35	3	3.88	7
Rash	3.48	6	3.83	6
Gums to bleed	3.43	4	3.99	8
Toothache	3.97	8.5	3.67	5
Cavity	3.97	8.5	4.37	9
Fever	4.21	10	4.79	10
Sore throat	4.32	11	5.08	11
Cold	4.71	14	5.09	12
Cut finger	4.58	12	5.36	14.5
Headache	4.59	13	5.36	14.5
Upset stomach	4.95	15	5.35	13

NOTE: The expectancy scores themselves range from 1 (lowest) to 7 (highest); the means are then ranked from 1 to 15.

Table 5. Rankings of expectancies for children in 16 age/sex/area groups

INNER CITY

Expectancy	Boys				Girls			
	under 10	10-11	12-13	14 & over	under 10	10-11	12-13	14 & over
Break tooth	1	2	5	1	4.5	2	2	5
Accident	2	3	3.5	2	1	1	1	1.5
Pull teeth	12	9	8	7	9	7	6.5	7
Missing school because of sickness	7.5	6	3.5	4.5	2	4	8	1.5
Flu	3	1	1.5	4.5	4.5	6	6.5	6
Rash	9	5	1.5	6	7	3	3	4
Gums to bleed	4	4	7	3	3	5	4	3
Toothache	10	10	6	8	11.5	9	5	9
Cavity	7.5	7	9	9	11.5	8	9	8
Fever	13	8	10	10	15	12	10	10
Sore throat	6	11	12	11	6	10	12	11
Cold	14	13	13	13.5	11.5	14	14	13
Cut finger	5	14	15	13.5	11.5	11	11	12
Headache	11	12	11	12	8	13	13	14
Upset stomach	15	15	14	15	14	15	15	15

cont. Table 5. Rankings of expectancies for children in 16 age/sex/area groups

NONINNER CITY

Expectancy	Boys				Girls			
	under 10	10-11	12-13	14 & over	under 10	10-11	12-13	14 & over
Break tooth	1	2	1	2	1	1	1	2
Accident	3	5	3	4	3.5	2	3	4
Pull teeth	2	1	4.5	1	3.5	3	2	1
Missing school because of sickness	6	4	2	3	2	4	6	6
Flu	4	7	4.5	8	7	5	9	9
Rash	8	6	6	5	6	6.5	7	7
Gums to bleed	7	9	8	7	8	9	5	3
Toothache	5	3	7	6	5	6.5	4	5
Cavity	10	8	9	9	9	8	8	8
Fever	9	10	10	10	10.5	10	10	10
Sore throat	12	11	12	13	12	11	12	14
Cold	11	12	11	12	13	14	13	12
Cut finger	14	14	15	15	10.5	12	15	11
Headache	15	15	13	14	14	13	11	15
Upset stomach	13	13	14	11	15	15	14	13

NOTE: The expectancy scores themselves range from 1 (lowest) to 7 (highest); the means are then ranked from 1 to 15.

Table 6. Mean dental problem expectancy scores and rankings for 774 children, by area

Expectancy	Inner city (N = 372)		Noninner City (N = 402)	
	Mean	Rank	Mean	Rank
Break tooth	3.15	1	2.92	1
Pull teeth	3.80	3	3.07	2
Gums to bleed	3.43	2	3.99	4
Toothache	3.97	4.5	3.67	3
Cavity	3.97	4.5	4.37	5

NOTE: The expectancy scores themselves range from 1 (lowest) to 7 (highest); the means are then ranked from 1 to 5.

Table 7. Rankings of dental problem expectancies for 16 age/sex/area groups

INNER CITY

Expectancy	Boys				Girls			
	under 10	10-11	12-13	14 & over	under 10	10-11	12-13	14 & over
Break tooth	1	1	1	1	2	1	1	2
Pull teeth	5	4	4	3	3	3	4	3
Gums to bleed	2	2	3	2	1	2	2	1
Toothache	4	5	2	4	4.5	5	3	5
Cavity	3	3	5	5	4.5	4	5	4

cont. Table 7. Rankings of dental problem expectancies for 16 age/sex/area groups

NONINNER CITY

Expectancy	Boys				Girls			
	under 10	10-11	12-13	14 & over	under 10	10-11	12-13	14 & over
Break tooth	1	2	1	2	1	1	1	1
Pull teeth	2	1	2	1	2	2	2	2
Gums to bleed	4	5	4	4	4	5	4	3
Toothache	3	3	3	3	3	3	3	4
Cavity	5	4	5	5	5	4	5	5

NOTE: The expectancy scores themselves range from 1 (lowest) to 7 (highest); the means are then ranked from 1 to 5.

SUMMARY

A study in May 1969 continued to replicate and extend research dealing with children's perceptions of vulnerability to health problems. Responses of 774 children, 8 to 17 years old, to 15 questions about the likelihood of encountering various health problems confirmed previous results indicating that perceived vulnerability is consistent across health problems. As in previous research, perceptions of vulnerability were predictably less consistent in younger children than in older ones. Moreover, a consistent pattern of expectancies was found that was not affected by age, sex, or socio-economic factors measured in terms of area of residence.

These results have relevance for public health professionals concerned with the content and timing of educational programs. For example, evidence continues to suggest that health educators interested in heightening children's perceptions of vulnerability, as a first step in shaping or inducing adaptive health behaviors, might find it appropriate to deal with a child's entire set of such perceptions rather than with the expectancies of one particular problem. And, there is some evidence to suggest that dental health education programs be included in a comprehensive health education program.

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